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For private circulation to plant pathologists within Australia.

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PLANT DISEASE NOTES.

CEREALS AND GRASSES.

BROWN STAIN OF RICE:

Many samples of rice from the last harvest at Wakool and on the Murrumbidgee Irrigation Areas contained a considerable proportion of discoloured "grains". These brown discolourations were most common on the glumes but in many cases involved the caryopses themselves, being, however, confined to the pericarp in the samples examined. Plating tests have shown that Alternaria tenuis auct. sensu lato is associated with the discolouration and miscroscopic examinations have shown that the fungus is present within the pericarp, but apparently has not entered the endosperm The cells of the pericarp show a diffuse brown pigmentation similar to that observed in black-pointed and smudged wheat grains, where Alternaria tenuis is usually associated also. Such discolourations develop in wheat when the ripening period is humid and it seems probable that the position is similar with rice.

Department of Agriculture, Sydney. - P.G. VALDER

HELMINTHOSPORIUM ORYZAE IN THE NORTHERN TERRITORY:

Observations in the rice growing areas of the Northern Territory showed that Helminthosporium oryzae Breda de Haan is present.

Wild rice (Oryza sp.) is dominant among the native grasses at Humpty Doo (40 miles south-east of Darwin) but is sparse at the Old Chinese Rice Gardens (about 15 miles east of Darwin). After the heavy Easter rains this year (1953), leaves of this wild rice were covered with brown, oval lesions caused by Helminthosporium oryzae. Occasionally similar leaf spots were found on Caloro rice at Humpty Doo. In the Rice Gardens area the lesions showed up somewhat later on wild rice but at that time they were not observed on the cultivated varieties.

A fortnight after Easter cool wet weather occurred again for about one week and heavy infection by Helminthosporium

oryzae occurred on Caloro at Humpty Doo. The disease was also found in the Rice Gardens at that time on the varieties Rexora, Zenith and Texas Patna but not on Magnolia. Measurements of conidia ranged 68-97/u x 14-18/u, 7(6-9) sept.

Entyloma sp. was found on Magnolia, Caloro, Texas Patna, and Zenith, causing somewhat similar though narrower lesions.

Northern Territory Administration, Darwin.

- W. STAHL.

FIELD AND FODDER CROPS.

DISEASES OF CLOVERS IN COASTAL N.S.W. - SPRING 1953:

Subterranean clover.

Although an unimportant plant in this region, subterranean clover was the pasture plant most affected by disease during this period. Rust (Uromyces trifolii-subterranei) was general, being more severe in southern areas. Mosaic was widespread, stands showing up to 100% infection and the plants showing varying degrees of stunting and distortion. In an experimental planting at Berry some varieties, following the onset of the mosaic symptoms showed a reddening of the outer leaves, progressive decline and death. These diseases have been transmitted experimentally but it is not yet certain whether one or more viruses are present. Non-parasitic conditions were also observed and many cases of plants showing a marginal reddening of the outer leaves and reduced growth were recorded. In one or two instances this appears to have been caused by magnesium deficiency but in most cases it was thought to be the effect of cold on the soft growth induced by an unusually mild spell in late Winter.

White Clover.

No mosaic was observed on white clover but there were some cases of quite severe damage by rust (U. trifolii trifolii-repentis) in southern district. The stem nematode (Ditylenchus dipsaci) was recorded on this host for the first time in N.S.W. at Berry, causing the death of many plants in low-lying paddocks.

Red Clover.

In the Hunter Valley most red clover stands observed contained an appreciable percentage of virus infected plants, some showing necrotic symptoms. Infected plants were observed in other areas also Phoma sp., Stemphylium botryosum, Pseudopeziza trifolii, Uromyces trifolii-fallens and unidentified crown rots occurred in trace amounts. Black blotch (Dothidiella trifolii) was recorded for the second time in N.S.W. on this host at Jamberoo.

Other Clovers.

Crimson clover showed a severe mosaic at Berry and a

rust (Uromyces sp.) was recorded on this host for the first time in N.S.W. Mosaic was also recorded on berseem clover and on clustered clover.

Department of Agriculture,
Sydney.

- P.G. VALDER.

A ROOT-ROT OF N.Z. BLUE LUPINS.

During 1952 and 1953 N.Z. blue lupins made very poor growth in a small area at the C.S.I.R.O. Field Station, Applethorpe. The plants were small and chlorotic in comparison with normal plants in the adjacent crop. Isolation and inoculation experiments demonstrated that the fungus Thielaviopsis basicola (Berk. & Br.) Ferraris was responsible for the disease. Although this pathogen is common in tobacco crops of the Texas-Inglewood district of Queensland, it has not been previously recorded on lupins in this State.

The field infection occurred shortly after germination, appearing as a necrosis of the root bark near the crown and later embracing the entire root system. The aerial portion of the diseased plants was spindly and chlorotic with abscission of the leaflets of the lower leaves.

Two phytoparasitic nemas Tylenchus costatus deMan and Rotylenchus erythrinae Zimmerman were associated with the roots of many diseased plants but were not invariably present. In order to determine whether infection by T. basicola was dependent on previous root injury by nemas or other soil factors, lupins were germinated in glass containers against absorbent paper which was kept moist by immersing the lower end in a complete nutrient solution. The roots grew against the paper and came into contact with the fungus which spread over the paper from a source of inoculum some distance from the seed. The inoculum was in the form of a small piece of diseased root or portion of a pure culture of T. basicola on potato dextrose agar. In all cases, the seedlings were soon infected and, as the roots were undistrubed, it appears that the entry of the fungus into the root is independent of previous root injury. Root diseases due to T. basicola are frequently associated with excessive soil moisture but there was no evidence of a positive correlation with this particular host-parasite relationship. Lupins were grown in pots of well-drained soil contaminated with spores of T.basicola and the disease was soon rampant.

The author is indebted to the Commonwealth Mycological Institute and the late Dr. T. Goodey of Rothamsted for confirming the identifications.

C.S.I.R.O.,
Applethorpe, Q'ld. - R.C. COLBRAN.

VEGETABLES.

BEAN RUST:

During a recent visit to Hawkesbury Agricultural College, Richmond, plots of several bean varieties were examined for the presence of disease. Bean rust was quite prevalent in some lines and several plants of the variety Westralia were seen to be infected. Westralia, which originated in Western Australia as a selection from the cross Kentucky Wonder x Prolific was until now resistant to the races of bean rust that had been recorded in Australia. On the American system, these races corresponded to races 2 and 17, which were able to attack climbing beans, and a variant of race 17 able to attack dwarf beans as well. It would now appear that another race capable of attacking Westralia has arisen. Tests will be conducted to confirm the ability of this isolate to attack Westralia and to determine which race is present. The author would be glad to hear of any other cases in which rust has been recorded on this variety.

Department of Agriculture,
Sydney.

- J. WALKER

FRUIT

BLACK SPOT OF APPLES AND PEARS - ERADICANT SPRAYS FOR CONTROL

Late last Autumn at Orange N.S.W. sprays of phenyl mercury chloride (0.3%), sodium pentachlorphenate (0.5%) and sodium dinitro-ortho-cresylate (0.5%) were applied to Delicious apple trees heavily infected with black spot. Subsequently leaves were collected and allowed to overwinter under normal conditions at Orange. Since the beginning of September samples from these treatments and a control have been examined each week for perithecial development and ascospore discharge.

Phenyl mercury chloride prevented the formation of perithecia and no ascospore of Venturia inaequalis has yet been discharged from leaves treated with this compound (last sample collected 31/12/53). Sodium pentachlorphenate did not materially reduce spore discharge but seemed to hasten perithecial maturity slightly. With sodium dinitro-ortho-cresylate the spore discharge intensity against time followed the same general curve as the untreated but at a considerably lower level.

The above successful use of P.M.C. offers, in theory, new hope of improvement and simplification in control of black spot and possibly of its eradication. It is anticipated that the method of application may overcome the practical difficulties which were responsible for the comparative failure of eradicant ground sprays, and that it may also eliminate conidial carry-over on lesions on bark and bud scales.

No phytotoxic effect was observed on the tree sprayed with P.M.C. and it is anticipated that a small field test will be carried out next season.

Department of Agriculture,
Sydney.

- K.E. HUTTON.

UNUSUAL CONDITION IN APPLE LATERALS.

A secondary limb on a Sturmer apple tree at Cradoc in the Huon Valley showed unusual disease symptoms (6/11/53). Unpruned laterals at the head of the limb were very swollen and the top

third of each lateral was dead. Directly below the dead tissue leaf development was quite vigorous but degenerated to weak growth towards the base of the lateral. These laterals were 0.5 - 0.7 inch, diameter and 12-15 inches long. Laterals of similar length and age on healthy limbs were 0.2 - 0.3 inch diameter. A second group of laterals rising from lower down the limb were alive along their whole length but were irregularly thickened 0.3 - 0.4 inch diameter c.f. 0.1 - 0.2 inch normal. Growth at the tip of these laterals was vigorous but bunched and degenerated to weak growth below the top few nodes. On all laterals the internodes were considerably shortened - 0.3 - 0.5 inch c.f. 0.8 -1.2 inches normal.

On the limb, around the base of each lateral, was a swollen region. All swollen parts were rather soft and could be slightly depressed by the fingers. Laterals were quite pliant but when bent sharply readily broke off at the base, leaving a very clean scar - there was no tearing as experienced in normal wood. Detached laterals, though thick, could be bent rather more than normal and when they eventually snapped, the break was very clean.

When transverse sections were cut and double stained with haematoxylin and saffrinin various irregularities were observed. The pith and cortex were abnormally large in proportion to phloem and xylem, the relative softness of the twigs being due to the excess cortical tissue. The number of xylem vessels per high power microscope field averaged 20 c.f. 15 normal. Xylem fibres were much reduced in number, averaging 74 c.f. 173 normal. There was a uniform reduction in thickening of xylem fibres and vessels and of phloem fibres. The latter appeared normal in number. Near the tip of current season shoots, there was little or no differentiation of phloem tissue. Medullary rays extended some distance from the cambium into parenchymatous tissue. It seems that there is a delay in phloem differentiation and lignification of fibres. This may account for the large cortex observed and the clean breaking and pliancy of the laterals. The cause of this condition is unknown.

The writer is interested to hear of any similar conditions observed elsewhere in Australia.

Department of Agriculture, - J.R. WARD.
Hobart.

VIRUS DISEASES OF STONE FRUIT:

In the Orange district of N.S.W. symptoms have been observed on cherries, nectarines and peaches which agree closely with symptoms described for some of the stone fruit virus diseases of North America. The following is a brief summary of findings from surveys carried out at Orange in mid-November, 1953 and early January, 1954.

Cherries. Three diseases were recognised:-

1. Mottle leaf was present in the variety St. Margaret in all orchards surveyed, symptom expression ranging from a trace on one limb to an entire tree. This disease is already of some importance for in cases of severe infection yield was reduced and tree growth restricted. Also, wherever any infection was detected, the fruit, although more or less normal in size and shape, was hard, sweet and astringent to the taste.

Slight infection was also observed in the variety Florence in some orchards.

2. Sweet cherry crinkle leaf was observed in the variety Werders Early Black in one orchard. These trees have been infected for some years and the history of the block suggests gradual spread from one tree. The trees are almost worthless as they now produce very little normal fruit.

3. Symptoms suggestive of tatter leaf were occasionally observed, mostly in the variety St. Margaret.

Peaches and Nectarines.

In several blocks of Goldmine nectarines symptoms agreeing very closely with those described for peach rosette mosaic were observed. The disease is quite serious in that yield is reduced and refurnishing of limbs with fruiting wood is inadequate. The history of affected blocks suggests a relatively rapid rate of spread.

Symptoms suggestive of rosette mosaic in rather milder form were observed in a block of J.H. Hale peaches.

N.S.W. Department of Agriculture and
University of Sydney. - K.E. HUTTON & N.H. WHITE.

RIPE ROT OF STRAWBERRY:

A ripe fruit rot of the strawberry caused by a species of Gloeosporium was recorded in the Redlands district in October, 1951. During the past two seasons, losses have been widespread in the "jam" strawberry crop which follows the spring burst of flowering. Detailed investigations are in progress.

Department of Agriculture and Stock, Brisbane. - O.W. STURGESS.

ORNAMENTALS.

LEAF SPOT OF OLEANDER:

Recently, a specimen of oleander (Nerium oleander L.) showing a leaf spot was received at the Biological Branch. The spots were roughly circular, from 3-8 mms. in diameter, and had a pale central region surrounded by a distinct narrow brown margin. In the central area of some of the spots, were small balck fruiting bodies of a fungus of the genus Cercospora, which agreed closely with the description given for C. neriella Sacc. This organism has been reported as causing leaf spot of oleander in Greece (Alexopoulos, C.J.: Mycologia 32: 357, 1940) and, so far as can be determined, this is the first record of its occurrence in N.S.W.

Department of Agriculture, Sydney. - J. WALKER.

ANTIRRHINUM RUST:

Snapdragon rust (Puccinia antirrhini) has now been recorded in Queensland. Snapdragons, growing in a Brisbane home garden, were severely attacked during the early spring months (1953).

Department of Agriculture and Stock Brisbane. - O.W. STURGESS.

MOSAIC OR BLACK STREAK OF CYMBIDIUM ORCHIDS:

This disease was first described in 1943 by Magee (Aust. Orchid Rev. 8: 51 - 52) who expressed the opinion that the disease was caused by a virus though experimental evidence was not obtained. Subsequently Jonsen in U.S.A. reported a similar disease in Cymbidium and demonstrated that it was caused by a virus by mechanical sap inoculations from Cymbidium to Cymbidium (Phytopathology 41: 401 - 414). He found that it was a stable virus with a thermal inactivation point between 65 and 70°C, and that it appeared to be limited in host range and suggested that it may be a previously undescribed virus.

Recently the writer's attention was drawn by several orchid growers to symptoms on Cymbidium orchids that resembled

the mosaic or black streak disease. Four back bulbs of symptomless Cymbidiums were obtained and sap inoculations were made on to two of these from leaves showing the mottle and necrotic lesions. Six weeks after inoculation, both inoculated plants showed the typical mottle and chlorotic streaking on the newly developing leaves. As these leaves matured, some three to four weeks later, there developed the necrotic spotting and etching similar in all respects to that described by Jensen. The two uninoculated control plants remained free from any symptoms.

Sap inoculations were also made on to Datura stramonium, Nicotiana glutinosa and N. tabacum at the same time as on the Cymbidiums. No symptoms developed at all on N. glutinosa or tobacco but on Datura local lesions developed on the inoculated leaves within 10 days after inoculation. These lesions resembled those caused by tobacco mosaic virus on Datura. The local lesion development was not followed by any systemic symptoms.

Using the local lesion reaction on Datura, it was found that the virus in Cymbidium has a thermal inactivation point of between 65 - 70°C.

It would appear from the symptoms on Cymbidium, the sap transmission, and the thermal inactivation point, that Jensen's opinion that the disease described by Magee was the same as the one on Cymbidium in America is confirmed.

Whilst visiting America last year the writer saw some evidence that the Tomato spotted wilt virus could cause somewhat similar symptoms on Cymbidium to those caused by the cymbidium mosaic virus. Should both these viruses be shown to produce similar symptoms on Cymbidium then the above reaction on Datura will provide an easy means of differentiation between them.

Faculty of Agriculture, - N.H. WHITE.
University of Sydney.

NEW RECORDS OF VIRUS DISEASES OF ORNAMENTALS:

Daphne mosaic.

A mosaic disease of daphne which is fairly common in Sydney gardens causes some leaf distortion and mottling without

much reduction in vigour or blossoming. Inoculation from young affected leaves to a series of test plants in November, 1953, yielded symptoms of a strain of cucumber mosaic virus.

Mosaic of Dendrobium nobile and garlic.

An outbreak of lily mosaic amongst seedlings of Lilium auratum and L. speciosum in a Sydney nursery prompted a search for a possible source of infection. Plants of garlic growing nearby showed a mild systemic mottle and sap inoculation to lily seedlings from these resulted in the production of typical lily mosaic symptoms. A plant of Dendrobium nobile also growing close by showed symptoms of recent virus infection. The youngest leaves were patterned with concentric rings of yellow and pale green. This also yielded typical lily mosaic.

Spotted wilt of various ornamentals.

During the Spring of 1953 there was an increase in the incidence of rather virulent strains of tomato spotted wilt virus in coastal N.S.W. Infection was recorded on the following ornamentals for the first time in this State:-

Ranunculus: Up to 50% infection occurred in commercial crops in outer suburban areas during October and November. Affected plants showed a dying off of the older leaves, brown streaking on younger petioles and peduncles, slight mottle on younger leaves and the flowers were small and pale in colour but without definite pattern.

Dimorphotheca aurantiaca A commercial crop in the Kenthurst area developed 90% infection of young plants shortly after setting out in permanent positions in November. In these the virus produced a brown streaking and collapse of tissues on one side of the stem, death of the terminal bud followed by death of the plant.

Gladiolus A number of plants of the variety Mighty Monarch in a large commercial nursery at Ryde became affected shortly before flowering. The outer 2-4 leaves were normal, subsequently developed leaves were intensely yellow and reduced in size. In some cases this was accompanied by death of the flowerbud. Others showed signs of recovery, the youngest leaves being mottled with yellowish green streaks on a yellow background. No other variety was affected in this way.

Department of Agriculture, Sydney. - LILLIAN R. FRASER.

MISCELLANEOUS PLANTS.

RUST ON EUPHORBIA PEPLUS:

In September, 1953, in the Sydney Metropolitan area, the uredospore stage on the leaves and teleutospore stage on the stems, of a rust was noted on Euphorbia peplus, petty spurge. The teleutospore stage showed the fungus to be a member of the genus Melampsora, and the characteristics of uredospores and teleutospores, except for small differences in teleutospore measurements, agree very closely with those of Melampsora euphorbia Cast. described by Grove, occurring on Euphorbia peplus in England.

The teleutospore measurements found here were 40 - 55 µ x 7 - 13 µ, whereas Grove gives measurements of 50 - 60 µ x 10 - 14 µ.

Cunningham, in New Zealand, describes the uredospore stage of a rust on Euphorbia glauca, which also bears resemblance to the fungus described above, except that he mentions obvious germ pores on the uredospores, which could not be observed on the uredospores from Euphorbia peplus here.

It seems very likely that this fungus causing rust on Euphorbia peplus in the Metropolitan area is Melampsora euphorbiae Cast. which has not previously been reported in New South Wales. This spring the disease reached epiphytotic proportions.

Faculty of Agriculture, University of Sydney. - D.E. FINLAY.

RUST ON PETTY SPURGE:

Rust was recorded on Euphorbia peplus L. for the first time in Sydney suburban gardens during September, 1953 (see preceeding article). Within a month numerous specimens had been received from all parts of Sydney and by January, 1954, it had been recorded from Blackheath, Gosford and Oberon.

Department of Agriculture, Sydney. - LILLIAN R. FRASER.

CYTOSPORA SP. ON SUGAR GUM:

In 1950 and in 1952 cankers were observed on twigs and branches of sugar gum trees (Eucalyptus cladocalyx) in the Pittsworth area. The affected parts subsequently died and the disease was attributed to a species of Cytospora, a genus well known in this respect.

The first sign of infection is a grey elliptical slightly raised and longitudinally split canker 1 - 2 mm long. At this stage the infection is confined to the epidermis and outer vascular tissues. In the conspicuous later stage, the cankers consist of large, raised, well defined, irregular brown areas up to 4 inches long and with much secondary splitting. Death of the branch results from girdling and local infections of the vascular tissue.

In fourteen days in a moist chamber, perithecia are borne in numerous black, irregularly circular, erumpent stroma. These stroma are tubercular and subcuticular, and have a white mycelial weft enveloping the base. The diameter ranges from 150 to 450 μ. The spores are hyaline, unicellular, elongate, and allantoid, measuring 2.1 - 6.2 μ (average 4.2 μ) x 1 μ (approximately).

The disease appeared to be correlated with poor conditions of growth and unsuitable climatic conditions. Such is commonly the case with infections by members of this genus.

Department of Agriculture and Stock - W. PONT AND G.D.BOWEN
Brisbane.

MISCELLANEOUS NOTES

SOME FUNGI ATTACKING TIMBER:

Armillaria root rot of Pinus caribaea.

An outbreak of Armillaria mellea (Vahl) Quel., has been noted in a young 1949 planting of slash pine (Pinus caribaeA. Mor) at Cloud's Creek State Forest, near Grafton, N.S.W., during recent months.

Remedial measures are being taken at present to remove the affected trees, and the rate of spread, if any, of the rot under field conditions common to North Coast P. caribaea plantations will be studied.

Daedalea quercina wood rot.

Viable sporophores and cultures of an organism closely corresponding to Daedalea quercina (L) Fr. have been obtained recently from a motor car door frame of European beech (Fagus sylvatica L.).

Daldinia concentrica.

Daldinia concentrica (Bolt), Ces et de Not, was noted during June on living coachWood (Ceratopetalum apetalum D. Don) subject to flood damage.

Viable sporophores of D. concentrica have also been obtained (October 1953) from underground mine workings at Toronto N.S.W. These sporophores were found growing from the lower surfaces of Eucalyptus sp. roofing timbers.

Dematium twig spot of Kurrajong.

A Dematium twig spot has been observed on kurrajong (Brachychiton populneum R. Br.) from Mudgee during October, 1953. This organism has been recorded previously for kurrajong in N.S.W. (Dept. Agric. Sci. Bull. 46 Supp. 2 (1941)).

Yellow stain of Eucalyptus obliqua.

Paecilomyces varioti Bainer has been isolated from yellow-stained wood of messmate stringybark (Eucalyptus obliqua, L'Herit).

This agrees with previous records of this organism as a staining fungus of Australian hardwoods. It is cosmopolitan in distribution being responsible for example for the condition known in Great Britain as "golden oak". The species is reported to grow well in wood at 44°C.

Polyporus eucalyptorum.

The occurence of Polyporus eucalyptorum Fr. was noted on living river red gum (Eucalyptus camaldulensis, Dehn) from Campbell's Island State Forest, Riverina, during June 1953.

Cunningham considers this species should be known as Polyporus portentosus Berk.

Forestry Commission - D.W. EDWARDS.
Sydney.

COMMONWEALTH MYCOLOGICAL INSTITUTE NOTES.

NEW PUBLICATIONS:

"Catalogue of the Culture Collection of the Commonwealth Mycological Institute" (1953). Price 6/3, including supplements.

This publication has just come to hand and provides a key to the valuable collection of fungus cultures maintained by the C.M.I. The cultures are of interest in plant pathology, industry, taxonomic research and education. Special sets of cultures are supplied for the purpose of testing mould-proofing treatments of commercial products and also cultures used for the synthesis of organic substances and for physiological assay. A booklet is in preparation for school and university use giving an annotated list of fungi useful in education and which can be obtained in culture, and also instructions for growing them and preparing them for classes.

Cultures are distributed at 10s.per culture, post free by surface mail, with reduced rates to research workers in universities and to schools. Donors of cultures are given free exchanges and are entitled to have their gift isolations free when they may again require them.

"An Introduction to the Taxonomy and Nomenclature of Fungi" (1953), by G.R. Bisby. Price 12/6.

This is the second edition of the little gem, which was first published in 1945 as a guide to both junior and senior mycologists. Dr. Bisby has added a new part which he calls "Notes on Classification," giving his views on species and other concepts and some intricacies of the major groups of fungi. The new edition was written after the International Botanical Congress at Stockholm in 1950 and the several changes made in the Code of Botanical Nomenclature have been incorporated. As in the first edition, the Articles and Recommendations of the Code are given verbatim but the examples given have been chosen from names of fungi instead of Phanerogams, thereby enhancing their value to mycologists.

VACANCY IN THE C.M.I:

Applications are invited for a vacancy on the staff of the C.M.I. Desirable requirements are a good honours degree

in botany, preferably with plant pathology as a special subject, at least 5 years experience as a plant pathologist, particularly in tropical regions, a knowledge of languages, especially German and French, and sufficient interest in mycology to take up some line in taxonomic mycology. The incumbent will be required to assist in editorial work. Salary up to £1,350 but age, qualifications and experience will be taken into consideration in fixing the starting salary.

Applications close on 1/3/54 and Government employees should apply through their Governments. Apply to -

The Secretary,
Commonwealth Agricultural Bureaux,
Farnham House,
Farnham Royal, Near Slough,
BUCKS, ENGLAND.

Department of Agriculture,
Sydney.

- C.J. MAGEE
C.M.I. Official Correspondent.